

TRANSFORMING POWER

The Politics of Electricity Planning

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Contents

<i>List of tables and maps</i>	vii
<i>Acknowledgements</i>	viii
<i>Preface</i>	ix
<i>Introduction</i>	1
1 Institutions and electricity planning	13
Economics of electricity planning and LCUP	15
Organisational bias in electricity planning	21
Politics and electricity planning	27
Conclusion	36
2 Tasmania: The means justify the ends	37
A brief case history	40
Hydroindustrialisation and electricity planning in Tasmania	45
Comalco and the HEC	50
Justifying Gordon Below Franklin	52
Subsequent developments	56
Conclusion	59
3 New Zealand: The triumph of distributive politics	61
The institutional background	63
The Marsden B debacle	66
Planning under uncertainty	69
Thinking big	72
The vanishing surplus	76
Counting the cost and achieving reform	80
Conclusion	82

4	British Columbia: Winning reform after losing the Peace	84
	Planning for Site C	86
	After Site C	89
	Demand-side management and LCUP	92
	The role of institutions in utility reform	96
	Conclusion	102
5	Ontario: The decline and fall of the Electric Empire	104
	Hydro goes nuclear	107
	Things fall apart	110
	Providing the balance of power	114
	Public participation in power planning	120
	Structural change and the New Democrat Government	122
	Strong leadership and sustainable development	127
	Conclusion	129
6	Victoria: Uncertain reform	130
	The Portland smelter	134
	Loy Yang and the need for reform	142
	NREC and aftermath	145
	Demand management and development planning	149
	Restructuring, downsizing and privatisation	154
	Conclusion	157
7	Institutions and electricity planning	160
	Reverse adaptation	166
	Politics and reverse adaptation	169
	Directions for reform	176
	Contesting the future	178
	<i>Glossary</i>	181
	<i>Notes</i>	185
	<i>Bibliography</i>	208
	<i>Index</i>	222

Tables and maps

Map 2.1	Tasmania	38
Table 2.1	HEC load forecast and actual growth 1980–90	57
Map 3.1	New Zealand	62
Map 4.1	British Columbia	85
Table 4.1	BC Hydro operating losses	92
Map 5.1	Ontario	105
Map 6.1	Victoria	131

Introduction

If the theme of this book were to be expressed in a single question, it would be something like this: How can societies construct new sets of social institutions flexible enough to adjust both to the uncertainties of the postmodern age and to the new global, national and local concerns for environmental protection?

Its subject matter is somewhat narrower (and more modest) than that, but the question is one to which the present study – of electricity planning by public utilities in three nations – can provide some answers. To be quite specific, the study looks at the way electricity utilities have adapted to the risk and uncertainty pervading their worlds since at least 1973 when the first energy crisis brought discontinuity to what had previously been a stable planning environment. In a sense it is a comparative study of institutional innovation because it takes a state of the art planning technique – ***least-cost utility planning** – as an exemplar and, in a series of case studies, examines whether utilities adopted it (or similar approaches), if so, how readily and if not, why not. It seeks to identify the reasons for each of these responses.

The work attempts to appeal to two sets of readers. First, it seeks to interest those who work either in electric utilities or in government agencies who must deal with the issues of electricity planning and its relationship to matters of institutional design. At a more academic level, the issues the case studies raise about the relationship between society and technologically sophisticated areas of human activity involve some questions central to political science. Like many pieces of policy analytic writing, therefore, the book contains material that spans the practical and the theoretical realms.

* Words in bold are explained in the glossary.

The study was driven more by an interest in the policy issues than any grand theoretical scheme, and the theme of modernism and post-modernism was resisted for a while, but eventually it proved too seductive. Electricity planning, generation and supply is inescapably bound up with modernism. Economies of scale encouraged the formation of large organisations to undertake the activity. These economies of scale meant that electricity has long been regarded as a natural monopoly, which encouraged the establishment of public ownership in many countries and the regulation of public utilities in places (such as much of the United States) where that was anathema. The need for standardisation of voltage and frequency and the need for planning over long time horizons reinforced both the need for government involvement and the reliance of governments on technical experts. The technology encouraged centralisation. Since high levels of electricity consumption came to be considered as integral to any modern industrial society, and since demand seemed to increase endlessly (desirably so, if demand was inextricably bound up with economic growth), electricity planning became emblematic of the modern age: seemingly depoliticised, and undertaken by technical experts.

While the 'end of ideology' might have been problematic in other areas of modern society, there seemed little doubt that it ended in the electricity industry once the basic questions of ownership and regulation had been settled. The electrical utilities that generate and supply this product are themselves archetypal of modernity; they are organisations that possess many of the characteristics of Weber's ideal type of bureaucratic organisation, which is central to modern society. Electric transmission lines came to stand as symbols of modern society. And electricity forecasting and planning became leading examples of the central role played by science and technology as legitimating ideologies in modern societies. Forecasting was conducted on the positivistic, natural science assumptions favoured both by engineers and by the economists who craved natural science respectability, overlooking the fact that it was an activity undertaken in a self-reactive policy context in which the outcome being forecast could be affected not just by other agents in society but also, where forecasting and planning occurred in the same agency, by the forecaster.¹ Indeed, since the forecast outcome could have positive or negative consequences for the forecasting organisation, there was a real risk that the forecast itself could become a powerful tool in attempts by the forecasting agency to maximise its advantage.

In many respects, the kind of organisation adopted by the electrical utilities during their development phase can also be seen as modernist, not just in the sense that form follows function but also in their emphasis

on bureaucracy and 'Fordism', or mechanistic structures of control built on a 'fully rationalised base of divided and deskilled labour'.² Private electrical utilities were often run along business lines by people with business skills, but at lower levels they relied on the expertise of engineers; in public utilities, control tended to be given over to the engineers almost completely, so both were modernist in the sense that, as Clegg put it, 'Employment [is] based on specialised training and formal certification of competence, acquired prior to gaining the job'.³

While there are limits to the utility of such a term, the modernist label is appropriate for electrical utilities, embodying as they do the very spirit of modern industrial society. Their product is totally standardised, and it relies on the exercise of technical rationality. This combination of technical rationality and the integration provided by common professional training made electrical utilities very powerful organisations capable not only of supremacy within their own policy arena but also of considerable influence in other arenas such as economic development.

Modernism can be seen as positivistic, technocentric and rationalistic, and was identified with the belief in linear progress, absolute truths, the rational planning of ideal social orders and the standardisation of both knowledge and production.⁴ On the other hand, Harvey has identified the most startling feature of postmodernism as its total acceptance of ephemerality, fragmentation, discontinuity and the chaotic.⁵ The traditional electric utility – with its economies of scale, standardised product, technical-scientific rationality and related positivistic planning – can thus be seen as being representative of Fordist modernity. Risk-adapted utilities are bound to stress economies of scope (diversity), decentralisation and flexibility. Whether this adds up to Harvey's 'flexible postmodernity'⁶ is not certain, but neither is it central to our argument, which (more modestly) is simply that utilities have had to adapt to the uncertainties of what we could call the postmodern age.

The very strength of the utilities became their weakness. Donald Schon has pointed out that all institutions are to some extent monuments to past problems.⁷ Public electrical utilities became monuments to expansionist electricity planning, supported by prodevelopment politics, which militated against searching political scrutiny because politicians wanted to be able to deliver the benefits the construction and operation of an expanded electricity system would bring to their constituents. These imperatives often meant that concerns for the natural environment (in the form of air and water quality or wild and natural rivers with hydroelectric potential) and with the social disruption power projects could bring were often given short shrift in decisionmaking.⁸ The strategic location of utilities allowed them to brush such concerns aside, and it also allowed them to push for expansion long after it ceased to be

necessary or desirable. Utilities came to suffer from what Langdon Winner has termed 'reverse adaptation', or the selection of ends to suit the available means.⁹ Many utilities yielded to the temptation to forecast ever-expanding demand because it served the goals of organisational maintenance or expansion. It was not just that demand forecasts were self-fulfilling prophecies; it was also often the case that utilities' expansion plans represented self-prophesying fulfilments of bureaucratic ambition. When demand failed to match these expectations from the mid 1970s many utilities ran into problems, having expensive over-capacity that they found difficult to sell. This outcome was not solely confined to utilities in public ownership, but it did have some severe financial consequences for investor-owned utilities, and some utilities defaulted on debt.¹⁰

These uncertainties in the electricity demand equation sheeted home to utilities what the period of 'endless' expansion had masked: that there were sizeable uncertainties in the planning and forecasting of electricity, especially since these activities took place over a long time frame. Further, the uncertainties had increased not just because of the effects of energy price shocks but also because simultaneous demands for environmental assessment and planning had extended still further the lead time for power station construction. As the construction of excess capacity demonstrated only too clearly, this uncertainty was reflected in very real costs that had long been masked by the ability of utilities to market the output from any excess capacity.

New planning approaches were developed to deal with these uncertainties. Least-cost utility planning (or LCUP, which is explained further in chapter 1) employed advances in information-processing technology to develop interactive models to identify the lowest-cost development program under a wide range of demand scenarios. **Demand-side management** (DSM, sometimes referred to as demand management, or DM) and non-conventional sources of supply came into greater prominence under the LCUP approach not just because of any social or environmental advantages these technologies might have been deemed to have but also because they could be brought on line with very short lead times and thus provided *economic* advantages for utilities in reducing the costs of uncertainty.

The costs of excess capacity were felt in most countries, but there is no better example of the problem than France. Electricité de France (EdF) is a publicly owned utility formed in 1946. It took control of a few municipal companies and some nationalised industries that generated electricity for their own requirements.¹¹ EdF adopted a nuclear expansion program from the late 1960s, which resulted in considerable excess capacity after the mid 1980s, despite an aggressive promotion of elec-

tricity consumption after 1970.¹² As a result it had to suspend nuclear investments and attempt to find export markets elsewhere in Europe.¹³ Indeed, in the face of a stagnating economy, low demand growth and a heavy commitment to nuclear energy, 'electricity forecasting was virtually turned into an electricity sales program, and EdF has received the order to strengthen its domestic sales "pitch" and to extend its commercial strategy to the international arena'.¹⁴

Electricity planning in France has been described as demonstrating 'technocratic elitism'.¹⁵ It had relied on projections from past demand as a means of forecasting, an approach that had proved successful during the period when electricity was achieving market penetration, because demand was growing as fast as supply could increase. The rule of thumb in the postwar years was a doubling of demand every ten years. But then things began to go awry, and forecasts of future demand became self-fulfilling prophesies. Baumgartner and Midttun have described the problem thus:

The moment potential demand caught up with actual supply, the forecasts were in danger of being proved wrong. But then EdF learned that it could use pricing and sales policies to produce the demand that its method had predicted and which, with unchanged policy stances, would not have materialised.¹⁶

Things got worse after the oil crisis in 1973 because the French state took the deliberate decision to address its balance of trade and exchange rate crisis (and to restore its lost industrial grandeur) by making a heavy commitment to nuclear generation. This policy led beyond self-fulfilling forecasting to reverse adaptation, because the commitment to the nuclear path has meant that conservation options have been overlooked and planning has become a search for customers to use the capacity of generating plant already planned or under construction, even if those customers were outside France.

This result came about because of the administrative centralism of the French state planning system and the integration achieved by the state planners sharing a common background as graduates of the élite engineering schools.¹⁷ While the Ministry of Finance approved EdF's plans, and the Planning Bureau mediated between these agencies and other energy suppliers, 'the quarrel remains entirely within the family of graduates from the élite engineering schools'.¹⁸ The role of these *grandes écoles* in providing institutional integration is a point to which we shall return in chapter 1.

The situation in the United States has been in marked contrast to that in France. The US Public Utilities Regulatory Policies Act of 1978 encouraged deregulation and competition in the electricity industry. By the early 1990s non-utility power producers were providing 38 000 **MW**

to national supply, or about 5 per cent of the national total. A further 60 000 MW was under construction or in various stages of development. What this meant was that, at the margin, most new generating capacity in the US was being provided by independent power producers.¹⁹ In addition, encouraged by innovative state regulatory commissions, many utilities were investing heavily in conservation. Forecasting appears to have been more reactive in the United States, seemingly as a result of the absence of centralism, with instead a 'market-like' arena with competing sources of expertise.²⁰ We shall return to the situation in the United States in chapter 1 when discussing the role of institutions in electricity planning in greater theoretical depth, but the important point to note here is that the considerably brighter picture in the United States appears to have more to do with the presence of alternative sources of advice and creative policy intervention than with the presence of private ownership.

Yet private ownership is often seen as a panacea for problems in the electricity sector. The electricity sector in the United Kingdom underwent radical restructuring as part of the Thatcherite reforms. The assets and liabilities of the former Central Electricity Generating Board were transferred to four new companies: National Power Company, PowerGen, Nuclear Electric and the National Grid Holding Company. National Power and PowerGen were then floated as public companies, but Nuclear Electric had an uneconomic asset base, and it was continued in public ownership. The area boards that had undertaken distribution were established as companies on a regional basis and assumed ownership of the National Grid Holding Company, regulated by a Director-General of Electricity Supply with power to issue licences for transmission and distribution under the Electricity Act.²¹

However, one can question whether such a structure is necessarily more likely to produce better planning. The presence of private utilities with free access to the transmission grid was not able to prevent significant problems in the United States, nor did it necessarily lead to the adoption of new approaches to planning and conservation. One problem, for example, is that the perspectives of private utilities, private consumers and society on such questions as the value of conservation do not necessarily coincide, a point to which we shall return in chapter 1.

All of this suggests that there is a need for new sets of institutions if the new approaches to electricity planning, which offer so much by way of both economic savings and minimisation of environmental problems such as global warming, are to be adopted. Some of these changes will be in the nature of utilities themselves as organisations, but we can also expect that changes in the broader institutions involved will also be required. At the organisational level, risk-adapted utilities open to supply

from cogenerators and other non-utility generators, and to demand-side management, are likely to be very different from the old-style modernist organisations.

If the old electrical utilities can be seen as modernist, the responsive utilities can be seen as approximating the postmodern, as defined by Clegg:

Where modernist organisation was rigid, postmodernist organisation is flexible. Where modernist consumption was premised on mass forms, postmodernist consumption is premised on niches. Where modernist organisation was premised on technological determinism, postmodernist organisation is premised on technological choices made possible through 'de-dedicated' microelectronic equipment.²²

While there is a degree of resonance between the responsive electrical utility and Clegg's attributes of the postmodern organisation, however, the extent to which the former have resulted from 'technological choices made possible through "de-dedicated" microelectronic equipment' is debatable. While microelectronics has made possible some advances in electricity generation and load management, the stimulus for change has come primarily from a consideration of the growing costs of very much *dedicated* electric equipment used in the past in an age of increasing uncertainty and the need, therefore, for less dedicated inflexibility in electric power system planning. The technology has made flexibility possible, but the economics of uncertainty has made it more compelling; there is a need, therefore, to be wary of explanations based on a view of technological determinism.

Our purpose here, then, is to examine the forecasting and planning processes in a number of electrical utilities and the way these utilities have responded to the uncertainties of what we might call the post-modern era with a view to identifying some of the institutional factors leading to reverse adaptation and those conducive to the reform of these utilities into organisations adapted both to uncertainty and to related environmental concerns such as global warming.

The method of inquiry followed is that of a series of comparative case studies of electricity planning in a number of political jurisdictions. The case studies have been selected for reasons related both to the institutional themes explored and to the logic of comparison. The rationale for following this method and the basis for case selection can best be explained by reference to one of the institutional themes explored: federalism.

Federalism is one institutional factor that might be significant, and which we shall explore, because it has been argued that interstate competition to attract resource development can have pernicious consequences, with states bidding down social returns (including the

acceptance of greater environmental damage) in order to obtain the benefits of development. The Canadian staples theorist Garth Stevenson put forward this view concerning the effects of interstate competition on resource development,²³ and it became entrenched as orthodoxy about resource politics in Australia during the 1980s. It seemed to strike a particular resonance with the so-called resources boom in Australia in the late 1970s and early 1980s, a period of considerable investment in resource projects, which were mostly energy-based and which stemmed from international restructuring in the wake of rises in the price of oil. The scramble by the states for a share of the 'bonanza' (which turned out to be at least partly fools' gold) was most evident with the relocation of aluminium smelting capacity to Australia and the related electricity construction projects.²⁴

There have, however, been some dissenting voices. Galligan has pointed out that Stevenson's pessimistic view, which rests on horizontal competition between the states to attract resource development, ignores the potential benefits of vertical competition between State and Federal Governments, which could drive up the social returns from resource developments.²⁵ In a comparative review of state minerals and energy policies Galligan, O'Faircheallaigh and Kellow²⁶ found only qualified support for the Stevenson thesis and little evidence of low returns in the important export coal industry, for example. This is but one question that might be illuminated by the present study, but it is one that suggests a basis for its scope.

If we are to explore the features of the political system that are conducive to adaptiveness on the part of electric utilities, there is a need for research to be comparative rather than simply confined to one nation. In Australia the tendency has been not to examine comparable unitary nations and thus examine the effects of federalism (by making federalism the independent variable) but to try to find other 'experiments' in federalism to see whether different arrangements are possible or preferable. The comparison is made easier if it is made between two former British colonies because the countries share many traditions, institutions and aspects of political culture. For this reason Australian scholars of federalism have often seen Canada as a suitable candidate for comparison.²⁷

In restricting comparative research to Australia and Canada there is a danger, however, of ignoring the dictates of sound comparative methodology. If we are interested in the effects of federalism another federal system is almost the last place we should look in order to make valid generalisations. The comparison we should make if we wish to make theoretical generalisations about the effects of federalism is between federal nations and unitary nations that are similar in as many other

respects as possible. For this reason we should expect that there would be an abundance of research comparing federal Australia with its unitary neighbour, New Zealand, not just because of proximity but also because of the high degree of similarity between the two.

The methodological underpinnings of comparative politics are essentially the same as those underlying the study of public policy by the case study method. Both these areas of scholarly endeavour are confronted by the same methodological problems: (1) there is a relatively small number of suitable cases available for study; and (2) the number of variables that must be explained (at least potentially) is extremely large. The problem can be stated succinctly as 'small n , many variables'. Research in the social sciences usually relies on the availability of ample cases and a limited number of variables, so that there is no difficulty in finding enough cases in which the independent variable is either present or absent, and in which all other variables are essentially constant. Therefore, when changes in the dependent variable appear to be associated with changes in the independent variable, we can make relatively reliable assumptions about causal relationships between independent and dependent variables. With the study of comparative politics and the study of public policy the requirements for a large number of cases and a small number of variables are seldom met.²⁸

The way this methodological problem is best addressed in both cases is by focusing the analysis on cases in which there is as much similarity as possible of the variables that are not under consideration but variation of the features in which we are interested. Thus, if we are interested in the effects of affluence on voting behaviour, we examine voting behaviour in affluent and poor societies; if we are interested in the effects of federalism on the policy process, we compare the functioning of the policy process in federal and similar non-federal systems. The methodological dictates are different, therefore, depending on whether we are interested in studying the effects of federalism or studying how different federal systems cope with different problems. The latter point suggests that the comparison of similar federal systems is entirely proper, but the former suggests that comparisons between Canada and Australia have been methodologically unsound if they have sought to make generalisations about the consequences of federalism.

Of course, social science research does not often proceed on the basis of such neat comparisons. There are always problems in finding directly comparable cases, as each case has its own historical idiosyncrasies, and the best intentions of the researcher can come undone. For example, Ontario Hydro was selected for the present study as a Canadian case of an unchanging utility; instead, it became a study of a utility undergoing changes perhaps more significant than any other case selected! There is

also much insight to be gained from studying a single case in some depth. Inevitably, each case study is to a greater or lesser extent unique, and the approach here is (as much as possible) to let each case speak for itself rather than force it into some preconceived mould.²⁹ But if we cannot step into the same river twice, we can at least try to immerse ourselves in similar streams of issues and thus seek insights into points of similarity and difference.

For these reasons the present study looks at institutional factors and electricity planning in New Zealand as well as two Australian states and two Canadian provinces. As well as identifying the significant points of difference on which the study is based, it is also necessary to identify the important similarities between the countries in which the cases are located. All share a similar history as former British colonies. The British factor has given all a parliamentary system of government within a constitutional monarchy, but their colonial heritage has also helped to produce some common features of political economy, with a more activist state and a resultant tendency to prodevelopment politics.³⁰ This pattern resulted from the difficulties of capital formation in colonial economies, with the repatriation, rather than reinvestment, of profits and the immense size of the tasks necessary to develop the colonies relative to the size of their existing economies, and has been labelled 'colonial socialism'. It is a pattern also found in former colonies not part of the British Empire such as Argentina and Brazil,³¹ and it is this factor (rather than some British proclivity for public ownership) that explains the absence of private ownership of electrical utilities in the cases studied, although in some colonies (such as those in South America) established by nations with a strong statist tradition, the nature of the state in the colonising nation is undoubtedly also a factor.

There are, however, some differences, which will be seen to have had significant consequences for the reform of electricity planning. Most of these differences will emerge from the cases themselves, but one merits special mention: the use of regulatory commissions in Canada. As will be seen, the regulatory process has played an important part in bringing about reform in British Columbia and has had a lesser role to play in Ontario. There is no comparable institution in either of the Australian cases or in New Zealand.³² The adoption of such regulatory institutions in the Canadian provinces is undoubtedly a case of contagion from across the border in the United States, where there is a long history of the regulation public utilities in public or private ownership. The difference is especially significant because both New Zealand and several Australian states are going down the path of privatisation or 'corporatisation' of their electric utilities (following the United Kingdom) but without necessarily establishing similar regulatory frameworks. And yet, as a

World Bank study has pointed out, 'The first step in regulatory reform of the sector is to articulate clearly the objectives of reform and to focus on greater transparency and public accountability in governing energy-sector institutions'.³³

It is at least possible that the new privately owned utilities (or corporatised ones, which are to behave as if privately owned) might be just as prone to inflexibility and environmental insensitivity as the old, unreconstructed publicly owned utilities without the discipline, and above all the public accountability, that a strict regulatory regime can impose. Again, this has been recognised by the World Bank:

Greater openness through a more transparent regulatory process can also have significant long-run environmental benefits. Currently in many countries there is no intervention point within the command-and-control form of regulating monopoly power sectors where nongovernmental environmental concerns can be articulated. With a more open regulatory body, consumers, investors, and environmentalists can all be heard in setting policies regarding the investment program, pricing, access to service, reliability of service, energy conservation, plant location, and environmental issues.³⁴

It is not self-evident that consumers, investors and environmentalists are better off in the absence of regulation simply because the utilities are operating on a profit motive, and in areas such as conservation of resources and environmental factors it is likely that they will be worse off.

Bearing all this in mind, the approach followed here is to examine a number of case studies of electricity planning. The first two, Tasmania and New Zealand, are primarily cases that demonstrate the nature of past adaptation to expansion (and, incidentally, to environmental degradation). They are not intended to demonstrate the reform process but rather the persistence of old, ill-adapted institutions in the face of changed circumstances. Both have undergone subsequent reform, but in Tasmania it has been the result of planning going so far astray that the need for reform was undeniable. In New Zealand the rationale for reform was part of a wider drive to place public enterprises on a more commercial footing rather than being specifically focused on the electricity sector. Then follow two chapters that demonstrate the process of change in two Canadian utilities: British Columbia Hydro and Ontario Hydro. Ontario Hydro had originally been selected because it was widely regarded as a juggernaut, an 'electric empire' whose expansion could not be curbed.³⁵ Typical of the way reality can confound the researcher, the utility began to change substantially while the research was in progress, delaying the project, and it too became a study of change rather than stasis.

The final case study is one of attempts to reform electricity institutions in the Australian state of Victoria. It had been selected initially because it appeared in the mid 1980s to be an innovative state, and it too has

changed in terms of 'what it is a case of'. The relative lack of reform now dominates that case, and it is more now a study of factors limiting change. There is some method in the order in which the cases are presented because each will shed some light on the key issues at stake, firstly those institutional factors associated with old approaches to planning, then the processes of change and finally (in the Victorian case) the contending factors that limited progress towards reform.

I shall conclude by trying to draw some observations from the case studies, but first it is necessary to consider in greater depth some theoretical perspectives relevant to the study. This introduction has indicated that the book deals with the phenomenon of the reverse adaptation of institutions responsible for electricity planning and the reform of these institutions so that they are better suited to the uncertainties of the postmodern era. Before we examine the detail of the case studies we must gain a better understanding of some theoretical perspectives that can illuminate these issues. These concern the economics of electricity supply and least-cost utility planning, the nature of utilities as organisations and the politics surrounding publicly owned electrical utilities. Some of these points have been touched on here, but some must be argued for in greater depth. This task is addressed in chapter 1.